INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Report
(with presentation highlights)

The Fully Networked Car
- a Workshop on ICT in Vehicles

(Palexpo, Geneva, 2-4 March 2005)

Table of Contents

==

Executive Summary

On 2-4 March 2005, ITU-T and ISO jointly organized a workshop "The Fully Networked Car: a Workshop on ICT in Vehicles" associated with the world-famous 75th International Motor Show in Geneva.

ICT in cars is an area of significant interest and impact to both the telecommunication and the automotive industry. This 3-day workshop consists of an opening session, 8 technical sessions, 3 daily summary sessions and a wrap-up session of the entire workshop, and attracted more than 100 participants with 40 high-quality presentations from key speakers from both the automotive and telecom industry. During 9 sessions, topics such as the need for consensus between the public and private sectors and business models for interlinking the automotive and telecom businesses were discussed. Technically oriented sessions examined topics such as the standardization work on telematics, diagnostics, e-safety application development, the integration of in-vehicle systems with existing and future telecommunications infrastructures and seamless communications on the move.

This workshop introduced standardization work on "Information & Communication Technologies in cars" which has already being done or is being carried on, in particular by ISO TC 204 and ISO TC 22. After exchanging views on the future of ICT in motor vehicles among participants, both the automotive and telecom industry experts stressed the need for more standardization towards a holistic approach of open hardware architecture with standardized interface and open software architecture with standardized APIs. The workshop has shown that both the automotive and the telecommunication industry clearly benefit from standardization initiatives.

A major benefit from this workshop was the dialogue between various ITU-T Study Groups (such as SG12 and 16) and a number of ISO Technical Committees (such as ISO TC22 and 204). Through this workshop ITU-T identified areas where ITU-T can provide solutions are: (a) HMI - Human Machine Interface (SG 12, e.g. voice control); (b) integrating car communication as part of NGN; (c) exploiting the relation between home networking environment and cars.

In order to capitalize on this momentum, a number of outreach efforts were proposed, including the suggestion of ITU-T's participation in automotive events like the ITS World Congress (November 2005) to show how ITU's work will benefit the automotive industry, as well as session (or sessions) on the Networked Car in various ITU-T workshops, such as Home Networking, NGN and Ipv6.

After this workshop, ITU-T sees a clear interest and support (particularly from the car industry) for a follow-up workshop in 1-2 years. ITU-T will discuss shortly with Palexpo and the Geneva Motor Show how a next "fully networked car" event could be more closely integrated in the Geneva Motor Show.

This 2005 workshop consented again that the fully networked car could only be achieved by fostering collaborative efforts on the international level. This workshop saw the collaboration among ISO, CEN, ETSI and ITU where all participated in the panel organising this workshop and called for strengthening this collaboration and collaboration with other SDOs.

All sessions and conclusions of the event are now available on the web: http://www.itu.int/ITU-T/worksem/ict-auto/index.html and ITU is hosting an audio-archive of this event at: http://www.itu.int/ibs/ITU-T/ict-auto/.
.

Opening Session Overview:

Overview:
This session was chaired by Mr. Paul Najarian, Director of Telecommunications & Standards of Intelligent Transportation Society of America. Mr. Houlin ZHAO, Director of ITU-TSB made the welcome speech. 3 Presentations in this session reviewed the current status of telematics market and highlighted the importance of synergy between all stakeholders for the future success.

Highlights from presentation 1: Emerging opportunities for Telematics Standards
(Jacques GARCIN, Orange)

Provided Orange's perspective about mobile communication in cars

Highlights from presentation 2: Trends in Car Communication
(Walter MAISEL, Executive Vice President, Magna Electronics Group)

Business model is needed to overcome the gap between customer demands and services supplied. Car electronics will grew driven by safety and comfort. In term of architecture, suppliers would like to up-integrate to increase content & drive cost down, but OEMs would like to limit integration for components scale benefit & increase competition. To deal with complexity, the architecture needs to be redefined, particularly communication part. A shift from the proprietary approach paradigm to open standard architecture is needed to standardize for flexibility and scale, leverage communication technologies and implement a holistic, customer value-add focused, forward looking vehicle communication recognizing difference between vehicle-centric and consumer-centric functions with open hardware architecture with standardized internal interfaces and open software architecture with standardized API.

Highlights from presentation 3: Nissan Carwings Connect Driver to the World
(Kenji IKEURA, VP Pre-Program & Best Practice and competitive intelligence, Nissan Motor Co.)

This presentation provides Nissan's view about the ICT in vehicles:
- More value with less cost for customer is essential for growth of Telematics.
- Open model, Enhanced Car Navigation System and Greater power of customer's mobile phone are three policies of Nissan to build affordable and valuable Telematics.
- Nissan is focusing on "Driving related Services". Other services could be common among carmakers and service providers.
- Mobile phone is bringing Ubiquitous and seamless connection. It is becoming a part of personality now.
- Standardized connectivity is essentially required for customer's usability. All seven layers have problems in compatibility.
- Win-Win-Win relation among User, mobile phone and Car is the key factor to success.

Conclusions:
This session illustrated the overall objective of this workshop: to bring the automotive and telecommunication industries together to exchange ideas on the future of information and communication technologies (ICT) in motor vehicles.

Highlights of Technical Sessions

Session 1: Business Model Discussions

Objective:
A panel of stakeholder representatives addressed how multiple business models converge, evolve and become replaced over time as market forces determine the best value propositions for the technology being advanced. Examples from specific stakeholder groups will look to explain why the commercial elements of this new telematics ecosystem cannot follow a pre-defined plan, and discuss the level of variation and business models that can evolve with early participation in the standards, technology development and implementation.

Highlights from presentation 1: The Future Evolution of SKT Telematics
(Kyu-Kwan LIM, Vice President of Solution Business Division, SK Telecom)

This presentation introduced Korean telematics practice from SKT's view.
- Korea sees the core services in 4 provision stages are navigation, safety & security, information & m-commerce and multimedia services.
- Jeju Telematics Pilot City Project is a test-bed of SKT to provide most of telematics services using IT technology related to telematics business.
- The state-of-the-art telematics services provided to inhabitants and visitors to the popular tourist destination include:
    o a customized travel and traffic information service;
    o a 'Jeju Cultural Event' service that provides a variety of event schedules and tourism information;
    o a 'V-Shop' service that lets customers order and make payments for special products on Jeju Island through a wireless LAN and cellular network;
    o a 'Safe' service that connects customers with Jeju Island's Fire Control Center in the case of an emergency.

Highlights from presentation 2: Business models for vehicle infrastructure Integration
(Joyce WENGER, Booz Allen Hamilton)

The US VII (Vehicle Infrastructure Integration) initiative was used as the basis for discussing business models. The VII program is investigating the potential for 2-way, vehicle-to-vehicle and vehicle-to-roadside communications to provide a new suite of services to the operators of automobiles, trucks and buses. Various stakeholders, including automobile manufacturers, the US Department of Transportation, state and local highway departments, deployers and managers of the roadside infrastructure, telecommunications companies, application providers, and others, all have an interest in developing compatible models for VII to deal with financing, maintenance, for profit services, and other applications.

Highlights from presentation 3: Car Infotainment Solutions based on Standard - Intel Platforms
(Rudi NAWRATEK, Intel)

The strong demand of the Consumers for ease to use Car Infotainment Solutions (for Navigation, Communication and Entertainment), caused an self-dynamical market, Intel sees that different usage models and technologies will coexist as a migration path, or mid to long term.

Highlights from presentation 4: Mobile Wireless broadband
(Michael LEE, Dewell Corporation)

This presentation introduced the concept of mobile wireless broadband and the current development of iBurst technology as a concrete example of mobile broadband technology in commercial service today. While wireless industry evolution is difficult to forecast, this presentation reviewed different competitive technologies currently available and the standardization organization and progress of mobile wireless broadband.

Recommendations &Conclusion:
- Business model of ICT in vehicles should be studied in a holistic perspective, addressing the technical, economic, cultural, and political challenges, and moving from engineer and government focus to customer and business focus.
- We need to define a clear vision and implementation roadmap that makes sense given value chain complexity and system component relationships.

Session 2: The Policy Issues – Safety, Security, Privacy and Liability

Objective:
Consensus between public and private sectors is needed to address overlaps between safety, security, privacy and liability issues. A panel of global experts framed the major issues in this domain to help broaden discussion.

Highlights from Presentation 1: Telematics - Realizing the Opportunities
(Michael DORNAN, GartnerG2)

This presentation provides Gartner's analysis of the telematics service in European market. It proved that:
- Telematics is an actual need in the market
- We are in the slope of enlightenment
- Partnership between car and telecom industry is an accelerating factor for adoption of telematics service
- Government regulation like restrictions of in-car phone use is holding telematics back.

Highlights from Presentation 2: Legal and Liability Issues of Telematics
(Christine KANZ, IP Lawyer, Reimann Osterreith Koehler Haft)

- Standard to be applied for "legitimate safety expectations" is the "least informed and most endangered user"
- Manufacturer must inform about limits of the system, the existence of a system at all etc. For example, how does it perform under bad weather conditions etc.?
- Manufacturer must take foreseeable misuse into consideration and must take measures to avoid it.
- For remaining risks instructions and warnings must be given to the driver.

Highlights from Presentation 3: Location-Based Services (LBS)
(ChiDong KIM, Ministry of Information and Communication, Republic of Korea)

- Location Information Operator (LBS provider) must specify legal obligation on the stipulation when they collect personal location information or provide services and they must obtain subscribers' agreement.
- Location Information Operator can use privacy info only for agreed purposes and cannot provide it to third party.
- The minister of MIC is arranging policies to create good environment for using of location information
- MIC supports technical development and various LBS related businesses.

Highlights from Presentation 4: Data policy

(Dave Acton, ITS America)
- The VII technical and commercial issues are daunting, but the social issues more so.
- Data policy is a key social issue that must be resolved in order for VII to be realized
- Data privacy is a priority subset of data policy due to the need for public awareness and support

Recommendations & Conclusions:
- Safety: How does it aid the driver and safe operation? How does it improve safety for non-equipped vehicles
- Privacy: Who owns the vehicle data? Who can use the data? Is anonymity assured?
- Liability: Vehicle owner, automaker, infrastructure, and data
- Security: What are the implications?

These policy issues must be resolved in order for VII to be realized, and data privacy is a priority subset of data policy due to the need for public awareness and support.

Session 3: Standards Harmonization

Objectives:

Industry and standards organization representatives addressed how collaboration between all stakeholders (suppliers of communications, vehicles, infrastructure and applications/services) will impact standards development. Examples of the benefits of harmonizing global automotive standards in the past (such as the biannual Global Automotive Standards Summit) showed the value of establishing communications protocols between standards development organizations (SDOs), why this behind-the scenes collaboration advances the industry, and demonstrate the arbitration and intermediation between standards groups to avoid duplicity and counterproductive effort.

Highlights from Presentation 1: ITU, a potential partner for ICT in vehicles

(Jean-Yves MONFORT, ITU-T Study Group 12 Chairman, France Telecom)

This presentation introduced ITU in general as the international standardization body in telecommunication, its organization, membership, products and working procedure. It highlighted the standardization and collaboration work which have been done or been doing in ITU related to ICT in Vehicles.

Highlights from Presentation 2: Effective Harmonisation between SDO's

(Bob WILLIAMS, International Standardization Organization)

This presentation summarised the context and role of ISO in the development of International Standards, its performance and its relationships with other Standards Development Organizations, and the particular experience of cooperation in the ITS sector, and concluded with opportunities and challenges for SDO's in the future.

Highlights from Presentation 3: The road vehicle standards

(Jean-Pierre CHEYNET, Chairman of ISOTC-22 "Road vehicles", Bureau de Normalisation de l'Automobile)

This presentation introduced ISO TC 22, its work in road vehicle standards and its collaboration with UN WP29, etc.

Highlights from Presentation 4: Opportunities and Necessities for Standards in the Telematics Value Chain

(Rick NOENS, Corporate Telematics Standards Director, Motorola)

This presentation addressed the needs and the value of selecting pieces of the telematics value chain for standardization that will provide an enabler for industry growth. It also discussed standards activities currently underway globally and how these efforts will effect wireless communications with the vehicle.

Highlights from Presentation 5: Vehicles that communicate: A meeting of minds?

(Michael SHARPE, Radio Competence Center, European Telecommunications Standards Institute)

This presentation introduced ETSI in general as the European standardization body in telecommunication, its products and working procedure. It highlighted the standardization work, which have been done or been doing in ETSI in collaboration with ISO in telematics.

Recommendation & Conclusion:
- Collaboration, not competition, between SDO's
- More timely, market related, delivery of Standards
- Mutually supporting Standards environment
- Greater struggle to evolve the business model for SDO's

Session 4: eCall

Objectives:
This session is to discuss how in-vehicle emergency calls (eCall) can speed-up the response of the emergency services and potentially reduce the number of fatalities, severity of injuries and stress in post-crash situations.

Highlights from Presentation 1: E-Call in Europe

(Wolfgang A. REINHARDT, Director Regulatory Affairs, ACEA)

The presentation showed the current status and the rollout plan for the eCall project implementations in Europe as approved by High-Level Meetings of Public Authorities (Sep. 2004) and Industry (Feb. 2005). The implementation builds on the European E-112 concept and requires marginal additional technical upgrades on the PSAP (Public Service Anwering Points) as well as on the Telecommunication side (data in voice concept). To cover the significant cost for an in-vehicle eCall functionality, annual saving on the health and social cost side of more than 21 bn Euro more than compensate the investments needs as well as the cost of the service.

Highlights from Presentation 2: eCall: Research to standardization to implementation

(Michael SHARPE, Radio Competence Center, European Telecommunications Standards Institute)

- eCall Driving Group timescale:
  - ETSI standardization and eCall interface – Dec 2005
  - Finalize in-vehicle eCall functionality system architecture and start system development – June 2006
  - Start of rollout of infrastructure – June 2007
  - Finalise infrastructure, Sept 2009
- Gap analysis
  - Review ECDG requirements against existing requirements for access to emergency services
  - Review existing network standards/specifications to ensure they meet user requirements
  - Additional standards for terminal equipment?
  - Regulatory measures?

Highlights from Presentation 3: Current Status and Future Plan of HELP (Help System for Emergency Life saving and Public safety)

(Masatoshi MORITA, National Police Agency, Japan)

Emergency calls (Dial 110 calls) from mobile phones accounts for more than half the total number of emergency calls, and in many cases it is difficult to identify the location of a caller and it causes delay of the emergency vehicle's arrival. Japanese National Police Agency developed HELP to solve this problem. With this system, when an emergency incident occurs while driving, an in-vehicle unit and a cellular phone automatically transmit caller location information obtained from GPS to the operation centre, and then automatically activate voice communication with the operation centre staff by either manually turning on the "HELP switch" of an in-vehicle unit or by the automatic call activation function of the impact detector.

Highlights from Presentation 4: Next Generation E9-1-1

(Bob MILLER, ENP)

The "Next Generation E9-1-1 Network" presentation is a discussion of basic 9-1-1, enhanced 9-1-1, and next generation E9-1-1 in the United States with specific comments relative to Automatic Crash Notification (ACN) and the need for the public and private sector to inter-connect now.

Highlights from Presentation 5: E-Call and Automatic Crash Notification (ACN) in Vehicles

(David HORNCASTLE, Ygomi)

A cost-effective E-call solution has been elusive for the best part of a decade. Most carmakers that have offered telematics in their vehicles have included a form of emergency voice call with vehicle positioning, generally with a telematics service provider as the intermediary to the local PSAPs. This model has proven complex and costly and a large proportion of customers have not been renewing subscriptions for this and other services offered after the initial 'free' period for telematics services. The presentation outlined the envisaged ACN solution and addressed the issues surrounding delivery of a reliable, cost-effective emergency notification facility in Europe and the U.S.

Recommendation & conclusion:

To introduce eCall as a standard option on new type-approved vehicles from model year 2010 onwards it is required that all stakeholders, in particular all major Member States and insurance companies also sign a MOU (already signed by the Automotive Industry, the European

Commission, ERTICO and another 30 stakeholders) and commit necessary resources. Furthermore, a sustainable business model needs to be worked out until end of 2005 not to risk the planned introduction dates.

Session 5: Diagnostics

Objectives:

This session explored advances in on and off-board vehicle diagnostics that could communicate vehicle data in order to diagnose problems before they become an issue and react accordingly for improved reliability and operator awareness.

Highlights from Presentation 1: On and off board diagnostic
(Wolfgang BREMER, Robert Bosch GmbH)

OBD is today well known all over the world as standing for the stipulations of the lawmakers on the checking and monitoring of exhaust-gas-relevant data. In the Guidelines and Regulations as mandated by legislation, reference is made to standards which have been developed by national and international committees and which define the essential and most important technical specifications for equipment, plug-in connections, and the required communication protocols. The presentation described the co-operation between the authorities and standardisation committees (ISO/TC22/SC3), as well as dealing with the standards, which have been developed, and their connection with OBD. OBD could develop beyond the present-day exhaust-gas-relevant system to become a comprehensive general diagnosis procedure covering the complete vehicle with all its functions and systems.

Highlights from Presentation 2: Diagnostic process and place of some standard
(Tony MALATERRE, ACTIA)

Standard are important everywhere in the diagnostic process, to communicate with vehicle, to exchange data and so on. Wired communication is the classic way of today diagnostic solution. Wireless communication appears to facilitate productivity and to ease the use of diagnostic solutions.

Highlights from Presentation 3: European diesel heavy-duty OBD (On-Board-Diagnostics)
 (Jean-Francois RENAUDIN, Volvo)

In Japan, Europe and the USA, the heavy-duty diesel vehicles will also be soon subject to similar "OBD" requirements. It will become mandatory to diagnose malfunctions of the emission control system, but also to record all the parameters that are necessary for a prompt remedy and to be able to communicate this information to third parties. These "OBD" requirements will most probably be worldwide harmonized in the early 2010's.
In the rule making process, the existence of standards for structuring and communicating the information in case of malfunction has a great importance. These rules are technical rules, which only describe the level of equipment of the engine system and of the vehicle. Today, the other rules that specify when and how the OBD information is used for periodic inspection or roadside checks are mostly left to national initiatives.

Highlights from Presentation 4: Remote Use cases for Unified Diagnostic Services
(Jim SAMUEL, Dearborn Group)

Diagnostics of Electronic systems on Motor vehicles have developed from a variety of proprietary solutions through a series of standardisation efforts to what are now described in ISO 14229 as Unified Diagnostic Services. It is likely that since this standard is based on what vehicle manufacturers already do that this will provide the framework for diagnostic implementations for many years and on a variety of communication protocols. In communication terms a "service" delivers specific functionality across a communication link. This presentation describes how particular high-level functions could be implemented remotely using some of the described services.

Recommendation & Conclusion:
- Diagnostic should be taken into account from engineering department, to the publication of diagnostic solution.
- Because of cost and complexity, new methods should be developed to avoid the complete system description and pattern recognition is one of these diagnostic methods.
- Standard are important everywhere in the diagnostic process.
- Wired communication is the classic diagnostic solution today. Wireless communication appears to facilitate productivity and to ease the use of diagnostic solutions**.**

Session 6: Network Platforms

Objectives:
Experts will discuss current direction in both wired and wireless networks, both in-vehicle and to communicate between vehicles and road infrastructure. Speakers will examine requirements of the underlying network to support new applications and services (protocols and access technologies) necessary for extra-vehicle communication.

Highlights from Presentation 1: AUTomotive Open System ARchitecture (AUTOSAR)
(SCHARNHORST, VW)

- AUTOSAR is one central standardization initiative by major OEMs and Tier 1 suppliers and now includes a large number of automotive, electronics and software companies, aiming to facilitate the re-use of soft- and hardware components throughout different vehicle platforms, OEMs and suppliers.
- The AUTOSAR standard was launched in 2002 as an open standard for automotive E/E architectures, which covers methods of software integration, basic software and functional interfaces. It will be completed and available for OEM product development in 2006.
- A new generation of vehicles introduced in 2001-2003 marks the transition from single components to a functional network.

Highlights from Presentation 2: Flex Ray - status and perspectives
(Guenter REICHART, BMW)

- FlexRay is a communication system targeted at high-speed (net data rate 5Mbps at gross 10Mbps) control applications in vehicles such as advanced power train, chassis, and by-wire systems.
- FlexRay supports these applications by providing architectural flexibility through scalability and functional alternatives.
- FlexRay is expected to be the de-facto communication standard for high-speed automotive control applications.
- Phase II of FlexRay will start by January 2006: standard maintenance, further development of features, guarantee conformance test process

Highlights from Presentation 3: MOST – Further Development of the ICT Communication Backbone

(Christian THIEL, OASIS Silicon Systems)

- PC and IT technologies will be integrated into the embedded real time system of the car,
- MOST offers a platform to connect the embedded in-car system with PC-based IT/Consumer application system
- Open standard, Device Interface IP is offered through a royalty free license agreement
- The major investments of all involved parties are maintained even if the network speed or physical layer is changed

Highlights from Presentation 4: Cooperative Communication Systems

(Knut EVENSEN, Q-Free /Bob WILLIAMS, ISO)

ISO TC204 (ITS) started a program to created the CALM (Continuous Air-interface for Long and Medium range) set of standards:
- To isolate the applications environment from the communications stack, and provide a seamless communications service using several communication medias.
- The standards include management functions to facilitate handover between medias and operators, support session handover between different media, stations, operators and service suppliers with minimum service interruption and provide flexible interoperability and future proofing to the market place.
- As network layer, CALM based on IPv6, which is the next generation Internet backbone protocol, and using media such as 5 GHz, infrared, 802.11 variants, GSM, UMTS, etc. inheritance systems so long as they can abide by common API (ISO 15628). It will also support new generation developments (currently such as mobile Wimax, 802.20 mobile broadband).
- Support ITS services and V-V, V-R, R-R communication
- Bring Internet into the vehicle

Highlights from Presentation 5: The connected car: Opportunities and technologies

(Mark GIRARDOT, Cisco Systems)

- Adoption success comes from clear benefits, standard technologies and ecosystem readiness
- Despite interest for enhanced car communication enabled features, there's limited willingness to pay from end-users
- Traffic & safety services should be the driving force of connected car initiatives
- Interdependence brought roadblock to connected car. Areas require standardization and focused coordination from a limited set of partners are:
    ° Car interact with internet require scalable and evolutive interface/security with car BUS CAN;
    ° Car-2-car and car-2-infra-2-car communication require standards in protocols as well as in technologies for road infrastructure
    ° So-called seamless communication to and from the car require to build an mutualize wireless infrastructure for car as well as a cleaning house process/organization to enable access-roaming across different service providers and technologies.

Recommendation & Conclusion:

Due to the increasing number of networked electronics components, a level of complexity has been reached which cannot be managed using traditional development processes and lack of standardization. Government, traffic authorities and environmental agencies are also critical

stakeholders. The automotive industry needs systems engineering, meaning a paradigm shift from a hardware, component-driven to a requirement and function-driven development process, and standardization.

Session 7: In-Vehicle devices and Human Machine Interface (including Voice Interface)

Objectives:
With the introduction of extra-vehicle communication, in-vehicle devices will change to incorporate methods and technologies that allow multiple use and increased functionality to support new applications and services. Presenters will also discuss the major issues in HMI with regard to driver distraction, information management and data presentation, the operational problems of speech transmission and processing systems when used in mobile environments and outline possible solutions based on acoustic and digital technologies. Presentations will highlight on-going work in standards in this area and requirements for enabling the effective exploitation of new technologies.

Highlights from Presentation 1: Ergonomics and HMI of in-vehicles systems
(Annie PAUZIE, National Research Institute on Transport and Safety, France)

- It describes research activities conducted in order to identify the criteria to apply while designing the interface and the dialogue features, to develop methodologies to evaluate acceptability and usability of these systems by the wide population of drivers.
- It gives information on eSafety initiative, started by EC, with a specific focus on HMI issues in relation to the European Statement of Principles.
- The presentation highlights the main results of a survey in several European countries on the use of equipments as navigation systems.

Highlights from Presentation 2: Standardization activities in the field of HMI for road vehicles
(Christard GELAU, BASt)

- Gives the status of the works made in ISO/TC22/SC13/WG8 , and in particular summaries the contents of ISO 15005, 15006, 15007 and 15008 on requirements, recommendations and testing procedures for HM dialogue, auditory messages/signals, video systems.
- Describes the progress made on HMI standardization, and specially on procedure to prioritise the messages presented to the driver.

Highlights from Presentation 3: Mobile Device Integration - Opportunities and Risks
(Thomas MODER, Temic SDS)

Analyses the risks and opportunities for Car OEMs, and gives some answers supported by examples (e.g., sending e-mails, downloading audio files).

Highlights from Presentation 4: Vehicles and Telecommunication – EMC Standards and Regulations
(Ariel LECCA, PSA Peugeot CITROEN)

- Reviewed main EMC interactions and of the existing Standards on limits and on testing methods of vehicle/telecommunication
- Summarized the statements of European Vehicle Directive

- EMC standards and regulations are one of the necessary steps towards a successful vehicle/telecommunication functional synergy.

Highlights from Presentation 5: Speech Enhancement Methods for Vehicle Applications
(T. HAULICK, TEMIC Speech Dialog Systems)

The communication between the in-car passengers can be improved by means of a car intercom system, where the speech signal of each passenger is picked up by one or more hands-free microphones. The speech signal is then played back over those loudspeakers, which are located near the listeners. Due to the closed loop operation of such a system, an appropriate signal processing is required to ensure stable operation.
By improving the downlink signal of the telephone by restoring missing frequency components from the received speech signal, even though the speech quality of the extended signal is not as good as the original wideband speech, a significant improvement is possible.

Highlights from Presentation 6: Perspectives on the use of Distributed Speech Recognition for in-car Telematics
(David PEARCE, Motorola)

- Showed the performance advantages of Distributed Speech Recognition including a DSR Front end.
- Indicated that cooperative activities in telematics should be a fine step forward.

Highlights from Presentation 7: Background Noise Simulation and Hands-Free Testing in a Car: The ETSI STF 273 Project and Its Impact on Car Hands-Free Testing
(Hans Wilhelm GIERLICH, HEAD acoustics GmbH)

- Defines test set up to assess, in cars, the speech quality of hands free terminals
- Gives a special focus on test methodologies to assess the quality of background noise transmission
- Gives perspectives of future developments and on availability of free databases

Highlights from Presentation 8: Evaluation of In-car Voice services: Tasks for the New Q.12/12
(Sebastien MOELLER, IKA Ruhr-University Bochum, Germany)

- Shows how speech recognition and speech synthesis may be affected by environmental and transmission impairments
- Reviews the methods for assessing the quality of speech services, including the definition and the use of quality prediction models

Recommendation & Conclusion:
- Importance of performance and good design of the HMI and Voice interfaces for two highly complementary objectives: better safety and better comfort .
- With better Quality of Services and designs, HMI improves the safety
- Car industry and partners have expressed their wishes for better quality and better understanding of user expectations
- Cooperation will give solutions to these issues. Reciprocal presentations in the relevant meetings could be one way.

Session 8: Seamless Communication on the Move

Objectives:
Supporting communication between anyone, any device, anytime and anywhere is becoming the major challenge for the makers of future telecommunication network platforms. A major goal is to bring to market multimedia communication solutions with seamless network interconnectivity for business customers on the move. This session will cover the evolution towards ubiquitous applications and services as well as in-vehicle solutions.

Highlights from Presentation 1: Ubiquitous services and applications: needs of mobile users
(Mitsuji MATSUMOTO, Waseda University/Tokyo, Japan)

- Needs of mobile users related to ubiquitous services and applications are described.
- In order to use the services and applications structured by many players seamlessly and interoperable, contents, devices and database in the network should be standardized.
- In the wireless access network, wireless LAN, optical LAN and DSRC-based hot spot-type communication mode network in addition to the Cellular Network will be increased. Therefore it is necessary to realize the interoperability and connectivity between those Network and Vehicle devices and between network systems.
- In particular, Mobile Office is extension to the existing e-mail and calendar applications and should make secure mobile access simpler and easier than ever.
- The following requirements need to be fulfilled:
   o Automatic service detection
   o WiFi access
   o Contextual controls
   o Auto-launch of Application and VPN
   o Simple User Interface

Highlights from Presentation 2: Solutions for MM communications on the move: Swisscom vision
(Roger WÜTHRICH, Head of Corporate Business, Swisscom-Mobile

- Integrate different technologies with:
   o Seamless handover functionality extended to corporate LAN/WLAN
   o WLAN, UMTS and GPRS 3 in 1 PC Card to 4 in 1 PC Card (with EDGE)
   o EAP-SIM based Authentification
   o Volume based pricing
- Hard work ahead:
   o Fragmentation/Atomisation devices and mobile OS
   o Severe security issues
   o Fragmentation in access technologies
   o Usability vs. built-in functionalities
   o Data chaos even worsening I a world with DRM

Highlights from Presentation 3: Solutions for MM communications on the move: NTT DoCoMo vision
(Nobuaki KITAGAWA, NTT-DoCoMo)

- Telematics Services on Business Portfolio:
   o Human-to-human: voice communication, email and videophone
   o Human-to-machine: web browsing, music/video distribution and m-commerce
   o Machine-to-machine: telematics, remote monitoring and home-networking

- Key Issues to Develop Telematics Services
    o Difference of product life cycle between mobile phones and auto vehicles (>10 years for auto vehicles, 1-2 years for mobile phones)
    o Seamless/integrated service available for both on-board and off-board is the key
    o Interface between mobile communications network and car navigation systems (Cable? Blue tooth? Embedded modules?)

Highlights from Presentation 4: MM Broadcasting and convergences: DAB/DVB Vision
(Edgar WILSON, EBU, Switzerland)

Radio and TV Broadcasters have chosen to use digital transmission technology in many ways in addition to simply rolling out large numbers of sound radio and television services. Examples range from TV to public transport in Singapore (DVB-T), High Definition TV (HDTV) in Australia, Digital Multimedia Broadcasting (DMB) to handheld devices in Korea, and DVB-H television services to mobile phones in Finland. All these service examples rely on COFDM - Coded Orthogonal Frequency Division Multiplexing - as the basis of the very robust transmission system common to T-DAB and DVB-T. But what they demonstrate is the extraordinary flexibility which digital technology provides to differentiate applications to suit their local marketplaces. The consumption of broadcast services is becoming increasingly personalised, and using devices which combine broadcasting with mobile telecoms, the consumer is able to stay informed, educated, entertained and interacting whenever and whenever he wishes.

Recommendation & Conclusion:
- MM Telecommunications trends to Any device/Anybody, Any where (nomadicity, mobility), Any time
- Seamless provision of MM Services and Applications is a clear requirement (voice, data, video) for mobile customers (retail and business)
- Mobile users are operating in a specific environment: access to additional facilities for security, navigation, entertainment, driving assistance, diagnostics, etc.
- Needs for inter-working between "on board" and "off board" capabilities at service, terminal and network level
- Key topics for standards coordination:
    o End-to-End Architecture "OSA" (e.g. OAM, APIs…)
    o Service capabilities (e.g. Performances, QoS …)
    o Specific interfaces (e.g. HNE …)

Workshop Conclusions and Recommendations

ICT have an ever-increasing share of innovation and added value in the automotive industry. This trend, which is widely assumed to continue well into the next decade, is driven by safety, assistance, comfort and legal or environmental requirements. Standardization becomes more and more critical to manage the complexity introduced by the increasing number of networked electronics components in vehicles. The workshop has shown that both the automotive and the telecommunication industry clearly benefit from standardization initiatives.

A major benefit from this workshop was the dialogue between various ITU-T Study Groups (such as SG12 and 16) and a number of ISO Technical Committees (such as ISO TC22 and 204). Through this workshop ITU-T identified areas where ITU-T can provide solutions are: (a) HMI - Human Machine Interface (SG 12, e.g. voice control); (b) integrating car communication as part of NGN; (c) exploiting the relation between home networking environment and cars.

In order to capitalize on this momentum, a number of outreach efforts were proposed, including the suggestion of ITU-T's participation in automotive events like the ITS World Congress (November 2005) to show how ITU's work will benefit the automotive industry, as well as session (or sessions) on the Networked Car in various ITU-T workshops, such as Home Networking, NGN and Ipv6.

Next Workshops

After this workshop, ITU-T sees a clear interest and support (particularly from the car industry) for a follow-up workshop in 1-2 years. If future workshops are to be held with the Geneva Motor Show at Palexpo, these workshops must be associated with an exhibition or pavilion dedicated to the "Fully Networked Car". A number of the participants were already willing to provide prototype models and displays.

However, the benefit of associating next workshops with the Geneva Motor Show need to be further studied. In order to integrate this workshop as a main-theme of the Geneva Motor Show, we will need more interest and support from the organization committee of the Motor Show to make it feasible. ITU-T will discuss shortly with Palexpo and the Geneva Motor Show how a next "fully networked car" event could be more closely integrated in the Show.

ANNEX

WORKSHOP EVALUATION

113 people attended the three-day workshop. 26% of the participants completed and returned the evaluation form. The data gathered from these respondents show that 46% were from the Telecommunications Industry, 20% from Automotive Industry, the remaining 34% were from Research Institutions, Universities, Standard Developing Organizations, media and other entities.

The ratings for whether the subject was of interest to participants show that Sessions 1 (4.0), Session 4 (4.2), Session 7ii (4.1) and Session 8 (4.3) were of most interest, and Sessions 2 (3.6), Session 3 (3.7) and Session 5 (3.3) were rated relatively lower.

The ratings for the Quality of the Sessions show higher ratings for Sessions 4 (4.2) and Sessions 4 8(4.0), relatively lower for Session 3 (3.6).

> 1= very dissatisfied, 2= dissatisfied, 3= neutral, 4= satisfied, 5= very satisfied

The average overall ranking of the Workshop is: 4.2.

More than 60% of the respondents have stated that they would like to see another event on automotive issues. The topics suggested are more on eCall, more technical details on inter-vehicle communications, vehicle infrastructure systems, voice user interfaces, privacy and wireless to and from vehicles.